


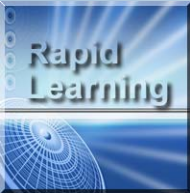
 **Rapid Learning Center**
Chemistry :: Biology :: Physics :: Math 

Rapid Learning Center Presents ...

Teach Yourself
MCAT Organic Chemistry in 24 Hours




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 **MCAT Organic Chemistry**
Introduction To Organic Chemistry in the MCAT

MCAT Rapid Learning Series

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Learning Objectives

By completing this tutorial, you will learn about:

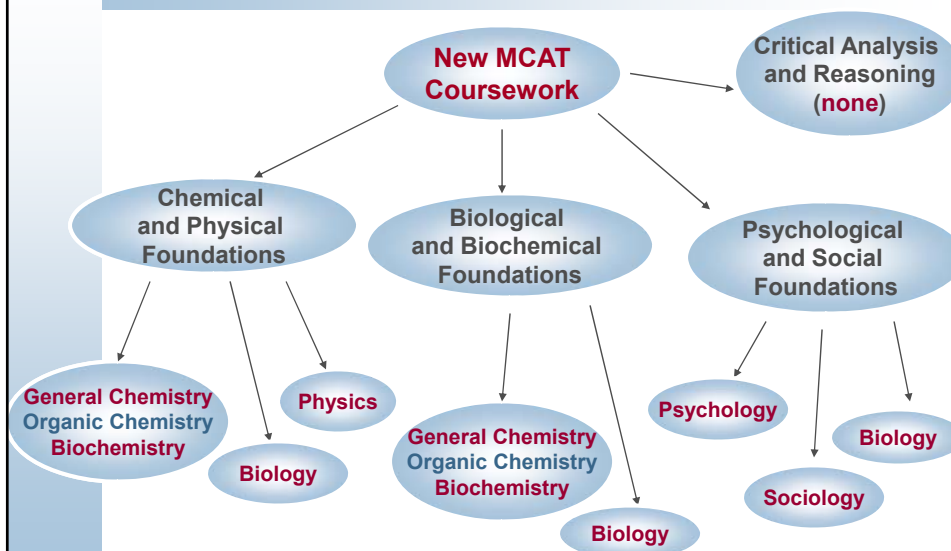


- The MCAT
- The MCAT test format and scores
- Rapid Learning MCAT Approach
- MCAT Organic Chemistry test topics
- MCAT Organic Chemistry question types and example illustrations
- Test-preparation strategies
- Test-taking strategies
- The “SURE” method

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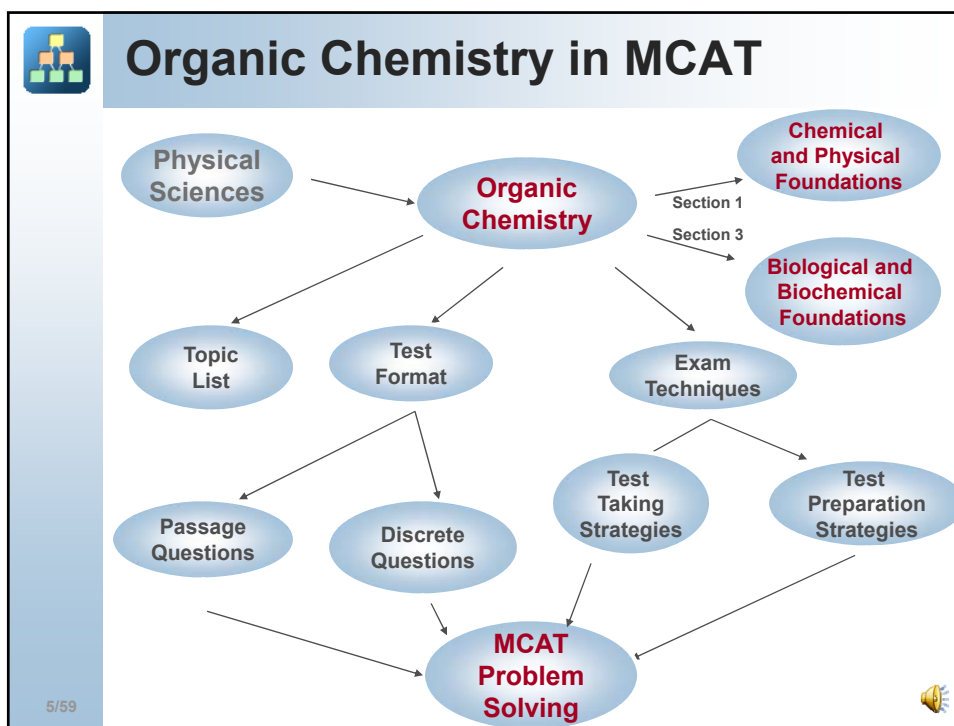


Concept Map - MCAT



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Introduction to the "New" MCAT

The slide features a blue header with a globe icon containing an information symbol (i) on the left and a photograph of a young woman looking at a laptop on the right. The title 'Introduction to the "New" MCAT' is centered in the header.

6/59



What is the MCAT?

Medical College Admission Test

The MCAT is a standardized exam that most prospective students must take in order to gain admission to medical schools in the US and Canada.



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When Can I Take The MCAT?

The MCAT is offered throughout the year in: January, April, May, June, July, August and September.

To register visit the MCAT official site:

<http://www.aamc.org/mcat/>

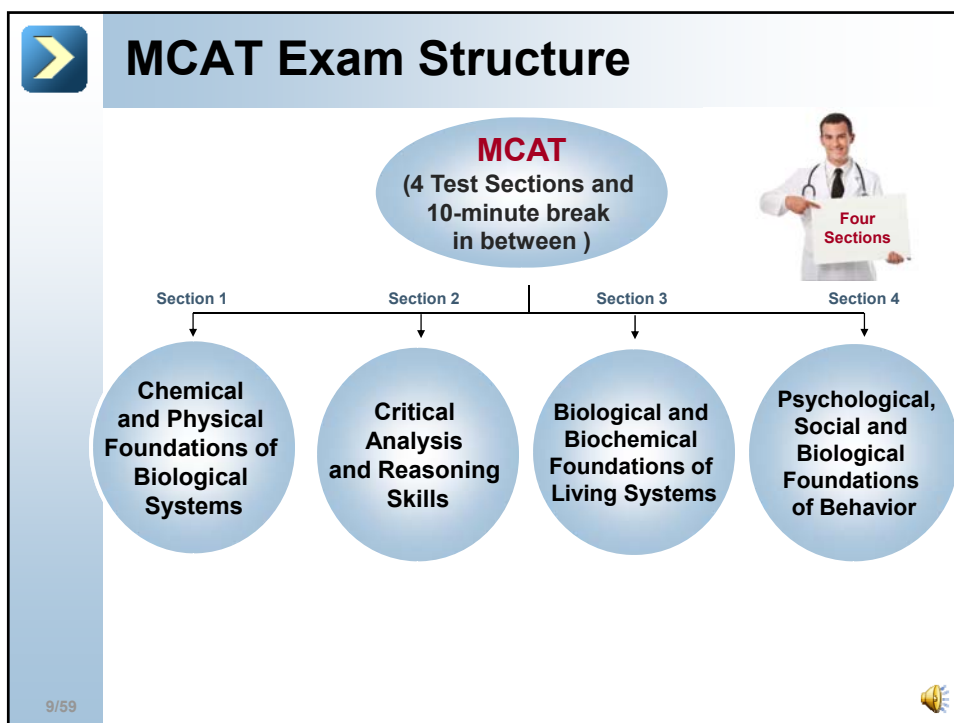
The ideal time to take the MCAT is when you have completed the basic science courses and between 12-18 months before entry into medical school.

A good approach, is to plan ahead about **six months** before taking the exam.



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MCAT Scores

The MCAT scores consist of four individual section scores and one total score.

Section	Range (Midpoint)
1. Chemical/Physical 2. Critical/Reasoning 3. Biological/Biochemical 4. Psychological/Social	118-132 (125)
Total Score (sum of 4)	472-528 (500)

The scores are released approximately 1-2 months after the test. The MCAT Scores are equated. The equating is designed to correct small difference in difficulty among exams on different dates.

The MCAT is completely computer based.

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Test Specifics and Subjects Covered

Chemical /Physical	Biological /Biochem	Psychological /Social	Critical /Reasoning
59 questions 95 minutes	59 questions 95 minutes	59 questions 95 minutes	53 questions 90 minutes
General Chem, 30% Organic Chem, 15% Biochemistry, 25% Physics, 25% Biology, 5%	Biochemisry, 25% Biology, 65% General Chem, 5% Organic Chem, 5%	Psychology, 65% Sociology, 30% Biology, 5%	<u>No specific courses</u> Humanities, 50% Social Sciences, 50%
44 passage questions & 15 multiple choice	44 passage questions & 15 multiple choice	44 passage questions & 15 multiple choice	All 53 passage questions

It's a longer test! The entire test will be 6 hours 15 minutes long, with an optional 10-minute break between each section. The total seat time is 7 hours 30 minutes. 💡

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Rapid Learning for the MCAT



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What is Rapid Learning?



Rapid learning is a set of break-through methods to **increase the speed of learning and deepen the understanding of the subjects**. This is done by breaking down each complex subject into 24 manageable units and facilitating rich-media teaching, providing an effective multi-modal learning opportunity.

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The Science of Rapid Learning

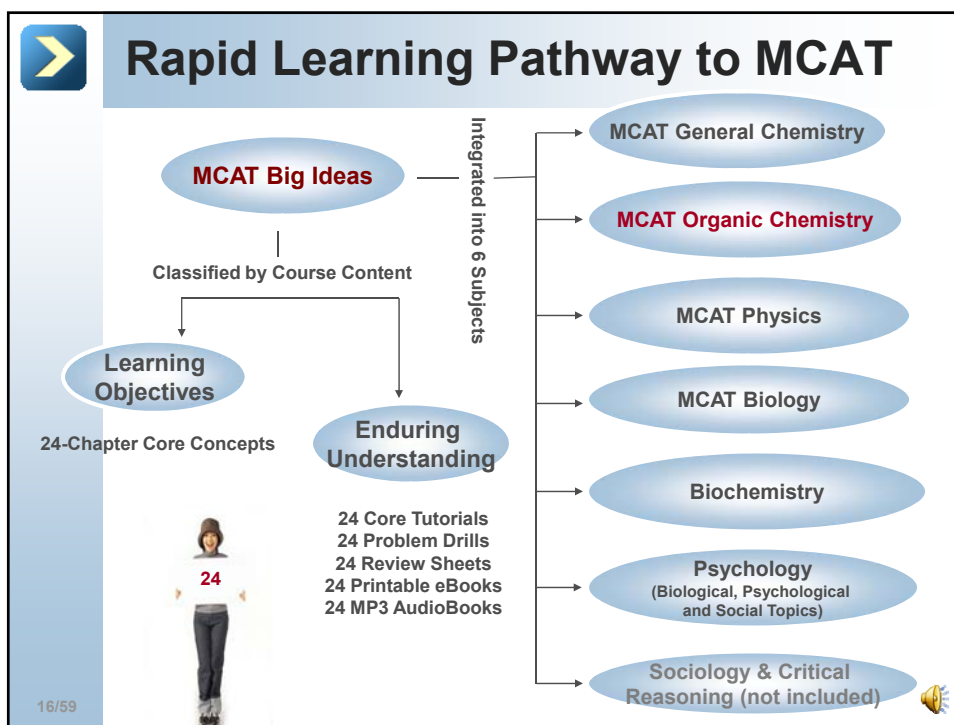
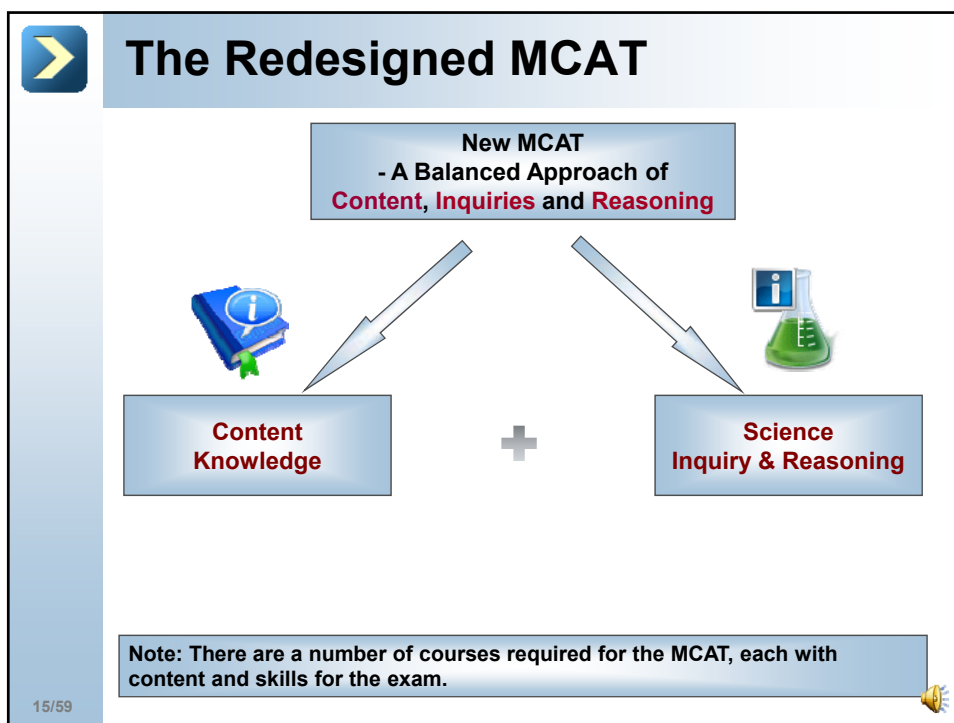


V: Visual
A: Aural
R: Read/Write
K: Kinesthetic

Rapid Learning courses are designed to optimize the learning experience for all four types of learners by presenting materials visually, providing narrations for aural learners, involving students with interaction drills and encouraging note-taking and re-writing of review cheat sheet to engage both read/write and kinesthetic learners.

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Rapid Learning vs Other Test-Prep

Rapid Learning is not a “review” course, rather a “re-learn” of the subjects from the start, visually.

Other Test-Prep	Rapid Learning
Printed books or test-prep classes by college students	Rich-Media Courses by professors
High-Level Review	Comprehensive Re-Learn

If you are looking for a simple review, go for amazon's test-prep books. If you are looking to re-study the subject courses from the beginning to end, use Rapid Learning.

For many, the combination of both might work the best.

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Organic Chemistry On The MCAT



1. Topics List
2. Overview of MCAT Organic Chemistry
3. Question Formats

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MCAT Organic Chemistry Topics

The MCAT covers the following organic chemistry topics:

- The Covalent Bond
- Molecular Structure and Spectra
- Separations and Purifications
- Hydrocarbons
- Oxygen-Containing Compounds
- Amines
- Biological Molecules
- General Concepts in Organic Chemistry



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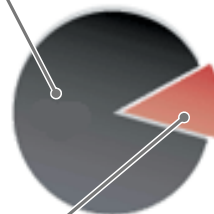


Passage and Discrete Types

There will be passage-based questions and standalone multiple choice (discrete) questions.

The majority (roughly 75%) of the questions will be passage-based questions. Passages can be an informational presentation, problem-solving techniques, research studies, or persuasive arguments in the context of biological systems.

	Type I # Passage Questions	Type II # Discrete Questions
Chem/Phys	44	15
Bio/Biochem	44	15



The remainder 25% will be standalone multiple-choice questions.

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Type I: Passage-Based Questions - 1

Passage-based questions require information found in the passage and some outside knowledge. Here is an example of a passage that might be found on the MCAT.

To study the properties of benzene, a series of reactions was carried out:

Reaction 1: Nitration – When benzene is heated with a mixture of concentrated nitric acid and concentrated sulfuric acid to 50°C, nitrobenzene is formed.

Reaction 2: Chlorination – When benzene reacts with chlorine in the presence of a halogen carrier like iron chloride, chlorobenzene is formed.

Reaction 3: Sulfonation – When benzene is heated with concentrated sulfuric acid to 80°C, benzene sulfonic acid is formed.

Reaction 4: Friedel-Crafts Alkylation – When benzene reacts with an alkyl halide in the presence of the catalyst aluminum chloride, an alkyl benzene is formed.

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Type I: Passage-Based Questions - 2

Each passage will be accompanied by a set of 4-8 questions.

Example:

(1) Using the Friedel-Crafts alkylation, what reagent would be used to form toluene from benzene?

- (a) Methyl chloride
- (b) Sulfuric acid
- (c) Iron trichloride
- (d) None of the above.

(2) When choosing an alkyl halide for use in the Friedel-Crafts alkylation, what important consideration must be made?

- (a) How easily the alkyl halide forms a radical.
- (b) Whether the resulting carbocation of the alkyl halide is subject to rearrangements.
- (c) Whether the alkyl halide is nucleophilic enough to attack the benzene.
- (d) None of the above.

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Type I: Passage-Based Questions - 3

(1) Using the Friedel-Crafts alkylation, what reagent would be used to form toluene from benzene?

- (a) Methyl chloride
- (b) Sulfuric acid
- (c) Iron trichloride
- (d) None of the above.

This question requires information directly from the passage.

(2) When choosing an alkyl halide for use in the *Friedel-Crafts* alkylation, what important consideration must be made?

- (a) How easily the alkyl halide forms a radical.
- (b) Whether the resulting carbocation of the alkyl halide is subject to rearrangements.
- (c) Whether the alkyl halide is nucleophilic enough to attack the benzene.
- (d) None of the above.

This question requires information directly from the passage and some outside knowledge.

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Type II: Discrete Questions

Discrete questions are multiple choice type with four answer options. You will pick ONE best answer. They are standalone without any passage (Correct answer in **red**).

(1) Water and lipids do not mix well due to the fact that ____.

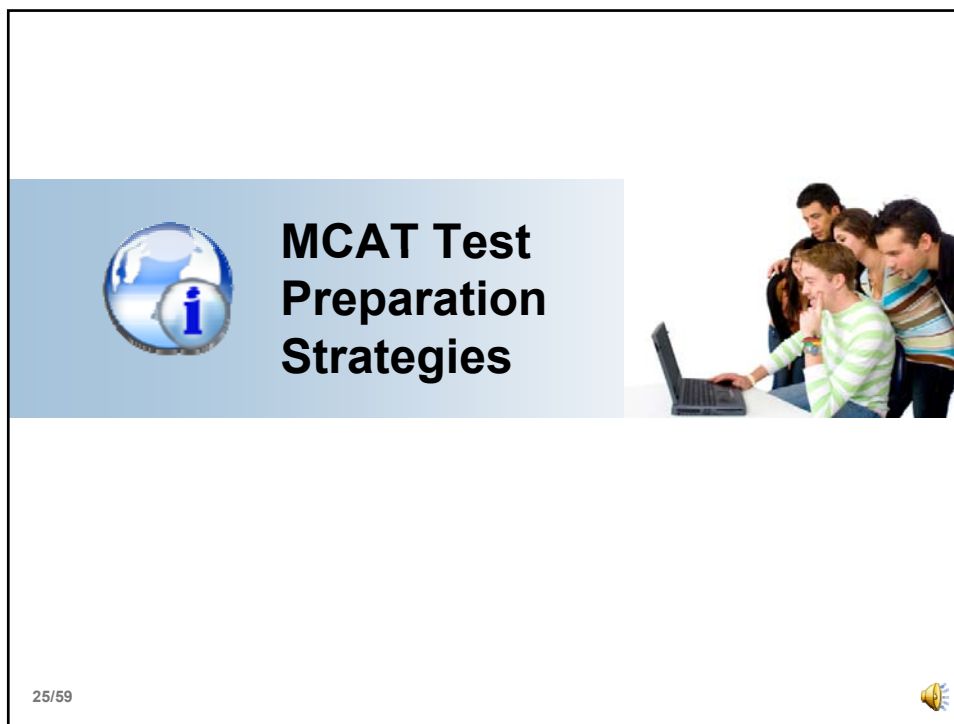
- (a) Lipids are water loving.
- (b) Water is nonpolar and lipids are polar.
- (c) Water is dense.
- (d) Water is polar and lipids are nonpolar.


(2) Patients, who are lactose intolerant, lack ____, which is needed to break it down.


- (a) A fatty acid
- (b) A sugar
- (c) An enzyme
- (d) A carbohydrate


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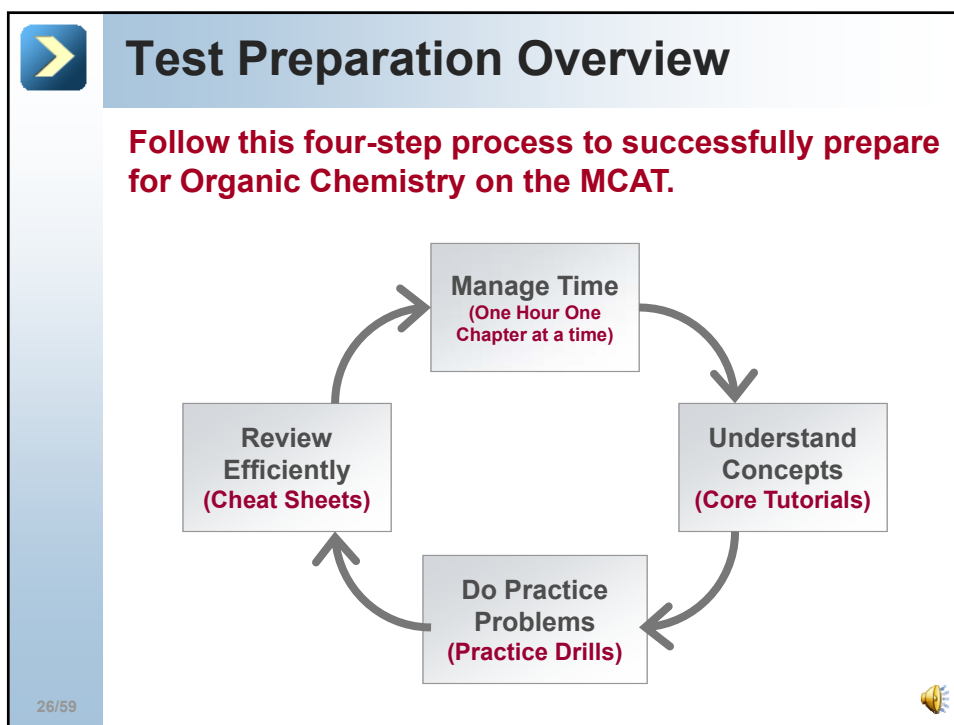





 **MCAT Test Preparation Strategies**

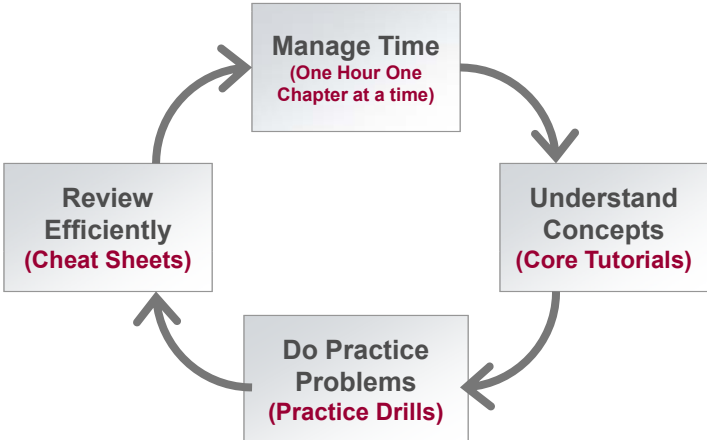


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 **Test Preparation Overview**

Follow this four-step process to successfully prepare for Organic Chemistry on the MCAT.



```
graph TD; A[Manage Time  
(One Hour One Chapter at a time)] --> B[Understand Concepts  
(Core Tutorials)]; B --> C[Do Practice Problems  
(Practice Drills)]; C --> D[Review Efficiently  
(Cheat Sheets)]; D --> A;
```

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Time Management - 1

Use your time wisely. Study only the topics that will be on the MCAT.

The MCAT does not contain every single Organic Chemistry concept.

There are some topics in your textbook that are not on the MCAT.

Don't waste time on concepts not tested.

Use this tutorial series to focus on the tested material.



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Time Management - 2

Focus core study hours on weak areas.

Study all of the topics listed on the MCAT Big Ideas.

Focus your efforts on your weak areas.

Don't study all of the topics concurrently. Master a topic before moving on to the next.



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Time Management - 3

Plan ahead: set a study schedule and make appointments to yourself.

Set aside a couple of hours every day to study.

Write down on your calendar the specific hours each day for the chapters.

In Rapid Learning, you will need to study 1-2 hours, i.e. 1-2 chapters, each day.

You need to study and practice EVERY DAY in the coming weeks and months.



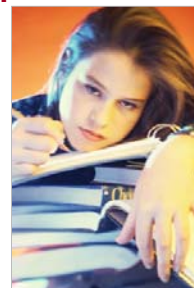
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How our Brains Store Information

Space out your study to avoid cramming.

Some students incorrectly believe that if they study more as the test date approaches, they will remember more.



However, as any neurologist will tell you, building long term memory by studying in set doses ahead of time increases memory and the understanding of concepts. Do not cram for the exam.

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Concept Mastery - 1

Translate formulas into words to give them meaning.

For example:

C_nH_{2n+2} is the general molecular formula of saturated hydrocarbons, where n is the number of carbon atoms in the molecule.

Put the formula into words: "For every n atoms of carbon in a saturated hydrocarbon, there will be $2n+2$ atoms of hydrogen."

CH_4 (methane): # carbon atoms = $n = 1$

$$\begin{aligned} \# \text{ hydrogen atoms} &= 2n + 2 = 2(1) + 2 \\ &= 4 \text{ hydrogens} \end{aligned}$$

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Concept Mastery - 2

Generalize concepts to save memorization and time.

Generalizing concepts allows you to understand and solve many other concepts without memorizing them.

Example:

General formula for a simple, acyclic alcohol is $C_nH_{2n+1}OH$.

We know that CH_4 is methane and C_2H_6 is ethane.

Hence, we can deduce that CH_3OH is methanol, and C_2H_5OH is ethanol.



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Concept Mastery - 3

Get your questions resolved.

If you have questions about a organic concept or problem, don't leave them hanging—Get an answer!



Whether it is a reaction or mechanism, make sure you do everything it takes to master the concept.

It may feel tedious, or even a waste of time to google for just one answer, but eventually, these unresolved questions will show up again, and very likely on your MCAT.

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Practice Problems

Practice problems to solidify concept understanding.

Concepts must be applied to fully understand them.

All macromolecules are formed by a process known as “polymerization” not by hydrolysis or something else. This requires the conceptual understanding of a macromolecule definition.



Concept understanding goes hand-in-hand with doing practice problems.

As soon as you learn a new concept, try to solve the practice problems that come with this tutorial series! You can also use textbooks and online sources for more practice!

Try to do a few full length practice tests in stages.

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Creative Supplemental Study

Summarize what you learn with cheat sheets.

Cheat Sheets: A cheat sheet is a summary of what you learned in a **SIMPLE AND BRIEF** outline for a chapter.

Use the ones provided with this series, but making your own is a wonderful way to cement concepts in your head!



Use your smartphone for audio learning.

Audio learning is ideal for learning on-the-go. It also reinforces what you have learned visually and practice the recalling from your long term memory.

Rapid Learning provides 24 audiobooks for 24 chapters in a subject. Plug the mp3 into your smartphone and start learning.



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MCAT Test Taking Strategies



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Test Taking Overview

Follow these steps during the test:

- 1 Know The Test inside and out before you take the MCAT.
- 2 Plan Your Attack the minute the test begins.
- 3 Use techniques to Build Focus: It will improve your score.
- 4 Apply techniques to Zoom In On The Answer & avoid exam traps.
- 5 If you don't know the answer, Guess The Right Way.



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Know the MCAT

Prepare ahead of time and know the test process.

- Bring your alert mind and a valid ID; Leave your personal items in your locker.
- Arrive at least 30 minutes before the start time and be prepared for the check-in process (fingerprint etc.).
- Know the format of the test inside out – no surprise.
- Know the instructions of the sections to save time the day of the test.



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Plan Your Attack

Use game-plan strategies.

- Scan the section and make a note of where the midpoint question is - try to be there half-way through the time.
- Use the onscreen clock to keep track of your time.
- Use approximately 1 minute per question for multiple choice - the rest of the time is needed to read and refer to passages.
- Except for the stand-alone questions, answer problems sequentially as information from an earlier problem may help you understand a later problem.



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Build Your Focus

Get into a rhythm by focusing.

- Confidence builds speed, accuracy and score.
- Trust your instincts and don't waste time second-guessing.
- Improve your concentration:
 - Do one problem at a time and do not worry about the problem before or after.
 - Use the scratch paper to organize your thoughts and draw your attention.
 - Breathe deeply and refocus on what you know.
- Set the time limit on each problem and move on.



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Guess The Right Way - 1

To make an educated guess, eliminate wrong answers first.

The MCAT does not penalize you for wrong answers. This means you should answer every question even if you have to guess, because there's a chance you might choose the correct answer.



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Guess The Right Way - 2

To make an educated guess, eliminate wrong answers first.

The MCAT does not penalize you for wrong answers. All problems must be attempted as there is a chance to get free points.

Which of the following is a true alcohol?

- (a) $\text{CH}_3\text{-O-CH}_3$
- (b) $\text{CH}_3\text{-CH}_2\text{-OH}$
- (c) $\text{CH}_3\text{-CO-CH}_3$
- (d) CH_3COOH

Let's assume you are not sure what the correct answer is. First, eliminate choices that you know for certain are wrong.

If you knew that CH_3COOH is a carboxylic acid, you could cross out choice (d). **Your odds have increased from 1-in-4 to 1-in-3.**

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Zoom in on an Answer

Be efficient in solving problems.

- Try to think of an answer to the question before looking at the answer choices...then look for your answer there (this helps you avoid traps).
- If you can't think of an answer first, scan through all the choices.
 - Don't pick the first one you see that looks good...there might be a better one later.
- Beware of absolutes—rarely are things “**always or never**” in the world!
- If you see two opposite choices, usually one of them is correct.



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Zoom In On the Answer - 1

Think of the answer, then scan the answer choices.

If you think of an answer *before* scanning the available choices, you are less likely to be trapped with an incorrect answer.

Which of the following is not a balanced equation from the chlorination reaction of methane?

- (a) $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$
- (b) $\text{CH}_3\text{Cl} + \text{Cl} \rightarrow \text{CH}_2\text{Cl}_2 + \text{HCl}$
- (c) $\text{CH}_2\text{Cl}_2 + \text{Cl}_2 \rightarrow \text{CHCl}_3 + \text{HCl}$
- (d) $\text{CHCl}_3 + \text{Cl}_2 \rightarrow \text{CCl}_4 + \text{HCl}$

If you look at the products formed, all seem to be correct. However, one should think carefully and consider each equation in its entirety.

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Zoom In On the Answer - 2

Think of the answer, then scan the answer choices.

By writing your thoughts on scratch paper, you might remember that chlorine is diatomic. Choice (b) is the only one in which chlorine appears monoatomically so you could be confident in selecting it as the correct answer.

What if you could not figure out the answer ahead of time?

The next strategy is to scan the answer choices. The answer choices give away a lot of information that can be used to solve the problem.

When you looked at choice (b) after comparing the possible answers, you would be reminded that certain elements are diatomic when found alone. Therefore, (b) must be the correct answer.

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Zoom In On the Answer - 3

Beware of the familiar and the absolute.

Obvious and familiar exam answers often tempt students to choose the wrong answer because they seem correct at first glance.

In this problem, students get confused as to which answer they should choose:



Which of the following is true?

- (a) All biomolecules are polymers except lipids.
- (b) All biomolecules are polymers except proteins.
- (c) All biomolecules are polymers except carbohydrates.
- (d) All biomolecules are polymers except nucleic acids.

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Zoom In On the Answer - 4

Beware of the familiar and the absolute.

Notice words like *always*, *never*, *none*, *all*, *every*, or *nothing*.

Such an answer is usually wrong because it only takes one exception to break the absolute.

In most cases, the relative words like *possibly*, *sometimes*, *most of the time*, or *often* indicate the correct answer.

In this problem, both choices B and C are incorrect.

Which of the following is true?

- (a) All biomolecules are polymers except lipids.
- (b) All biomolecules are polymers except proteins.
- (c) All biomolecules are polymers except carbohydrates.
- (d) All biomolecules are polymers except nucleic acids.

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Zoom In On The Answer - 5

Beware of the familiar and the absolute.

This leaves only choice A and choice D.

The correct answer choice is A.

(Because lipids are heterogeneous compounds, not polymers.)

Which of the following is true?

- (a) All biomolecules are polymers except lipids.
- (b) All biomolecules are polymers except proteins.
- (c) All biomolecules are polymers except carbohydrates.
- (d) All biomolecules are polymers except nucleic acids.

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Zoom In On The Answer - 6

**Out of two opposite choices, one is usually correct.
Similar choices are usually both incorrect.**

If two answer choices are very similar in wording, the answer is **probably** neither of them, because there can be only one correct answer.

However, if two answer choices are opposites, one of them is **probably** correct, because the test wants you to differentiate between two core ideas.



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Zoom In On the Answer - 7

**Out of two opposite choices, one is usually correct.
Similar choices are usually both incorrect.**

The sugar in milk is lactose, a disaccharide.

The two monosaccharides constituting lactose are:

- (a) Glucose and fructose.
- (b) β -D glucose and β -D galactose.
- (c) Galactose and mannose.
- (d) α -D glucose and α -D galactose.

If you are completely unsure of the answer, choices (b) and (d) merit your attention because they are direct opposites. In this case, **the correct choice is (b).**

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Zoom In On the Answer - 8

**Out of two opposite choices, one is usually correct.
Similar choices are usually both incorrect.**

Let's try another problem:

Which of these amino acids has an aliphatic side chain?

- (a) Phenylalanine
- (b) Tyrosine
- (c) Serine
- (d) Glycine

You can eliminate choices (a) and (b) as incorrect because they are aromatic compounds. The choices are narrowed down to (c) and (d).

The correct answer is (d) Glycine.

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The **SURE** Method for Passages - 1

- A majority of the questions in the organic chemistry section are passage-based, where the passage is on the left-hand side of the screen and the questions are on the right-hand side of the screen. Use the **SURE** method to approach these questions.
 - **S**kim
 - **U**nderstand
 - **R**ead
 - **E**xamine



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The **SURE** Method for Passages - 2

■ **Skim**

- Skim through the passage quickly and check the key facts, tables, graphs, and equations.
- Do not try to master every detail; some are usually irrelevant.

53/59



The **SURE** Method for Passages - 3

■ **Understand**

- Understand the main ideas and identify key facts in a passage.
- Take mental notes on the main ideas of the passage.
- Do not attempt to write down anything on paper at this point.

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The **SURE** Method for Passages - 4

■ **Read**

- Read carefully each question or statement; read it twice if necessary.
- Be very certain and clear what is being asked.
- For a reasoning question, use the scratch paper to draw it out and derive the answer.
- For a word problem, select the equations needed and plug in the numbers with proper units.
- Work out the calculation on paper as needed.

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The **SURE** Method for Passages - 5

■ **Examine**

- Examine each answer choice.
- Eliminate the obvious.
- Click to select the best answer based on the information from the first three steps.
- Refer back to the passage if you need supportive information.

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Learning Summary


Rapid Learning provides six MCAT subjects in general, and organic chemistry, biochemistry, biology, physics and psychology.

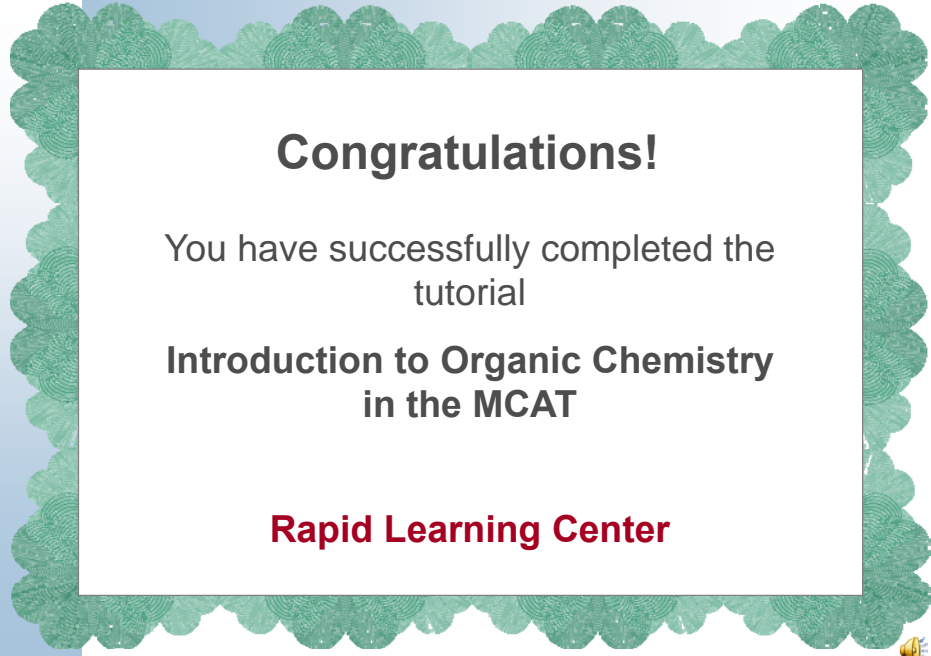
The MCAT is a standardized test for medical school admission, with four sections equally weighted.

Organic Chemistry is tested in two science sections, 15% and 5%. The contents are covered in a traditional two-semester organic chemistry course.

There are three science sections, each with 59 questions in 95 minutes, and one critical reasoning, 53 questions in 90 minutes.

There are two question types, passage and discrete questions. Each section has the score range of 118-132 with the midpoint at 125. The MCAT total score has the range of 472-528 with midpoint 500.

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Congratulations!

You have successfully completed the tutorial

Introduction to Organic Chemistry in the MCAT


Rapid Learning Center





Rapid Learning Center

Chemistry :: Biology :: Physics :: Math



What's Next ...

Step 1: Concepts – Core Tutorial (Just Completed)

→ Step 2: Practice – Interactive Problem Drill

Step 3: Recap – Super Review Cheat Sheet

Go for it!

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<http://www.RapidLearningCenter.com>

